RESEARCH ARTICLE

An Intelligent Human Security Device

Vishwanath.M.Soppimath*, Mallikarjun.G.Hudedmani*, Rajeshwari.V.Karadkal, Aishwarya.B.Pattanashetti, Karuna Kote , Pavitra.B.Lakkundimath

Department of Electrical and Electronics Engineering, KLE Institute of Technology, Opposite to Airport, Goku , Hubballi , Karnataka, India.

ABSTRACT: According to the report of World Health Organization (WHO), National crime records bureau (NCRB) 35% women all over the world are facing a lot of unethical physical harassment. This proposed work emphasizes Global Positioning Satellite(GPS) and Global System for Mobile(GSM) based human security system, that provides the alerts and messages with an emergency button trigger, whenever and wherever the person is in trouble. Especially women security has become major issue in the society. In this work the location of the victim can be tracked by using latest technology. This proposed model can be used to deal with the problem of security issue concerned with women, specially challenged people and children using GPS and GSM based tracking system. To automate this device, heart beat sensor is used, which will turn on the device due to abnormal increase in the pulse rate. Face image of the culprit can be captured using hidden camera which is stored in SD card, this will help to search the culprit and legal action could be discharged against that person.

KEYWORDS: Arduino Uno Controller Module, Camera Module**,** Relays, Sensors, Battery Power Supply, GSM and GPS modem.

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1. INTRODUCTION

Security is the condition of being protected against dangerous situations. Women across the globe continue to face the social challenges and are often victims of abuse and violent crimes. In India, every day more than 30 women were murdered and many are suffering austere mental and physical trauma. This proposed work focuses on a security system that is designed to serve the purpose of providing security to women, children's and specially challenged people, so that they never feel unsecured while facing such incidents[1-3] .

The safety is a very important issue due to rising crimes against women now-a-days. To resolve this issue we propose a GPS(Global Positioning System) and GSM(Global System for Mobile) based Human security system that has dual security feature. This system can be turned on by a person in case if they thinks they would be in trouble. It is useful because once an incident occurs with the person the may or may not get the chance to press the emergency button. In a button press alerting system, in case if the person unable to press panic button and no one will know that the person is in trouble. This device is to be turned on in advance by a user in case they are walking lonely on a road or some dark alley or any remote area. The devices requires the person to press the button once to turn on the system, then the information will be sent to the authorized personnel number through SMS message about the location of the incidence occurred. In this case even if someone hits the person or the get unconscious, due to panic, the system gets start automatically. This security system is very useful in saving lives as well as preventing atrocities against human[6-8]

2. LITERATURE SURVEY

Women's security is a critical issue in today's world and it's very much needed for every individual to be acting over such an issue. This work describes a GPS and GSM based women security system which will provides alerts and messages with an emergency button trigger [1-3]. In this article it is explained to design a portable device which resembles a normal belt. It consists of Arduino Board, GSM/GPS modules, screaming alarm and pressure sensors. When the threshold pressure crosses, the device will get activated automatically. Immediately the location of the victim will be tracked with the help of GPS and emergency messages will be sent to the registered mobile numbers .The concept of a smart wearable device for children, which aim to provide information to the parents for their child in current scenario [4-7].

This paper explains about application of microcontroller ATMEGA 328P and the MEMS sensor to sense any mishappening with victim according to the abnormal movements of the body. If in case MEMS sensor failed to sense the event, then the switch in the watch can be pressed manually. Then controller starts generating shock waves through shock wave circuit and at the same time a message containing location of the victim is sent to the registerd mobile numbers[8-12].

3. METHODOLOGY

The smart human security device is more like a safety system in case of dangerous situations. This device can be fitted in a jacket, which is portable with more features. The main objective of this proposed

**Corresponding Author: vmsoppimath@yahoo.com & mallikarjunh@yahoo.com*
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work is to overcome the crime against women, children and specially challenged people. This proposed work ensures safety and security using latest technology. This device actuate automatically by using increased pulse rate of the victim. Capturing the image of the culprit at the time of attack and image is saved in a storage device(SD card).This device is rechargeable.

4. BLOCK DIAGRAM

Fig 1 shows the main block diagram of proposed work which contains individual circuit block to meet the desired objective of the work.

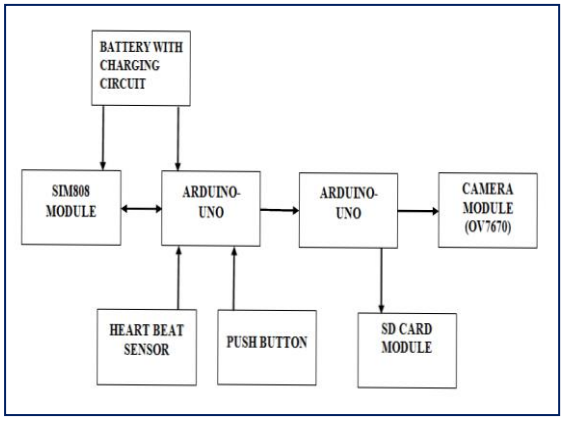

Fig 1: Block diagram of proposed work

The main purpose of this device is to intimate the relatives and police about the current location of the person during emergency situation. The emergency push button is held to one of the button of the jacket. When push button is pressed, the GPS and GSM system will be activated. A GPS will detect the location of the victim who is under trouble and GSM modem will send the information in SMS form to the predefined mobile phone numbers. The heart beat sensor actuates when heart beat exceeds 150 times per minute and messages are sent. Image is acquired from a camera module (OV7670) that is attached to jacket. It captures images at trigger i.e. button press by the user. These captured images are then store to SD card and saved for future use.

5. COMPONENTS DETAILS

5.1. Arduino Uno Controller

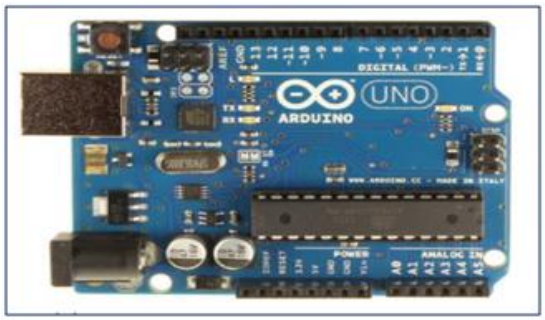

Fig 2: Arduino uno controller module

The Arduino controller is a cross-platform application written in Java, and is derived from the IDE for processing the programming language which is shown in Fig 2. It will introduce the programming technique and other features to become familiar with software aspects. It can be able to highlight syntax error, brace matching, and automatic identification, and also capable of compiling and uploading the programs to the on board in a single click. It is not required to edit files or run programs on a command-line interface. Although building on command-line, it is possible if required with some third-party tools such as Arduino.

The Arduino IDE is tool with a C/C++ library called "wiring" which performs the many common i/o operations easily. Arduino controller programs are written in C/C++ language.

5.2. BUILT IN GPS AND GSM MODULE

SIM808

Fig 3: SIM808 module

Fig 3 shows the inbuilt SIM808 module is a module where GPS and GSM modem are installed in single PCB. GSM/GPS module SIM808 from SIMCOM, which will supports Quad band network and combines GPS and GSM technology for the satellite navigation. This module can perform location-tracking, voice, text, message and data transmission.

5.3. CAMERA MODULE OV7670

The OV7670 Camera Module is a small image sensor which is shown in Fig 4, optimum operating voltage, providing all functions in a single chip of VGA camera along with image processor. Users can completely control the image quality, data format and transmission mode. It is highly sensitive and sustainable for illumination applications. Low voltage rating is suitable for embedded applications. Standard SCCB interface compatible with I2C interface, frequency range of 50/60Hz automatic detection.

Fig 4: Camera Module OV7670

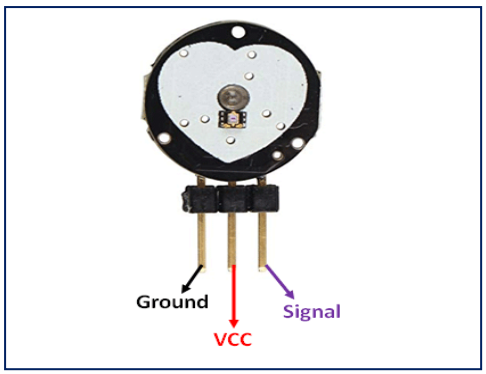

Fig 5: Heart beat sensor

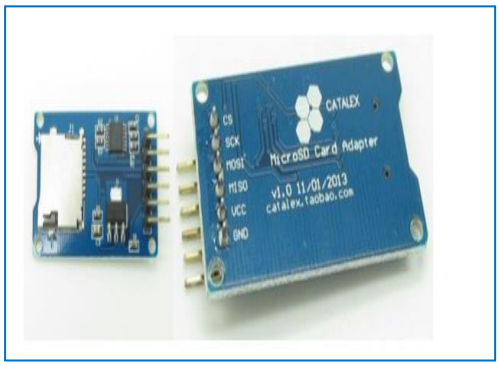

Fig 6: SD card module

Fig 5 shows the Pulse/Heart beat sensor. The sensor has two sides, on one side the LED is placed along with an ambient light sensor and on the other side we have some circuitry. This circuitry is responsible for the amplification and noise cancellation work. The LED on the front side of the sensor is placed over a vein in our human body. This can either be your Finger tip or you ear tips, but it should be placed directly on top of a vein.

LED light will fall on the vein directly. In veins blood flow exists when the heart is pumping, therefore when flow of blood is monitored in turn the heart beats as well. If the flow of blood is detected then the ambient light sensor will pick up more light since they will be reflect ted by the blood, this minor change in received light is analysed over a time to determine the heart beats.

5.4. Storage Device Sd Card Module

Micro SD Card Adapter is a Micro SD card read/write module which will support Micro SD Card, Micro SDHC card as shown in Fig 6.

5.5 Working and Implementation

In this work two ARDUINO UNO's are used. One ARDUINO UNO (A1) is interfaced with SIM808 module. Another ARDUINO UNO (A2) is interfaced with camera module OV7670. In the emergency condition the user should press the push button which is fixed on the jacket.

Initially ARDUINO A1 which is connected with SIM808 are in on state but the camera module will not activate until the pushbutton is pressed or automatically through heartbeat sensor. When button is pressed 7th pin of ARDUINO A1 gets high and the program dumped in the ARDUINO A1 starts to execute. This allows the GPS to track the location and GSM to send the messages with the link of location attached to it through SIM808 module to the stored number. The SIM808 module has a power key which should be pressed to get on but its not possible to user so the zener diode is used to on the SIM808 module automatically.

When the push button is pressed the 4th pin of ARDUINO A1 gets high and through relay A2 module also gets activated (when 4th pin of A1 is high it closes the NO(normally open) switch of relay and through this the ARDUINO A2 module gets the supply and starts to execute the program).After A2 gets activated the camera module starts capturing the pictures and they are stored in SD card module. It can capture upto 20 pics which will be the legal evidence for the crime. It contains a charging circuit also to recharge the battery. The pictures stored in SD card module are not in jpg format. In order to convert the picture the following steps should be followed

- The hex values of the captured pictures should be copied by opening the picture in "HEX-NEO-EDITOR" software.
- The copied hex values are pasted in note pad and should be aligned in a single line.
- The file is saved as data.bmp.
- The python code should run to change the image format from CSV to BMP.
- The image will be stored on the desktop and it can be in visual format. These images are the legal evidence for the crime.

The whole kit is placed in a jacket so that it can be wearable and it can be portable also.

6. RESULTS AND DISCUSSIONS

The proposed device is more like a safety system in case of emergency. This kit can be fitted in a jacket (similar to a blazer for women). It is a portable device with more features and functions. The emergency push button is provided in one of the buttons of the jacket. The camera is fixed to appropriate buttons of the jacket such that culprit image could be captured clearly. The main purpose of this device is to intimate the parents and police about the current location of the victim. A GPS system is used to trace the current position of the victim and a GSM modem is used to send the message to the pre defined numbers and the camera will take the pictures of the culprit. Below Fig 7 and 8 represents the "latitude and longitude" location will be sent with an alert message to the registered mobile numbers for every 5-10 sec in single click through SIM808 module.

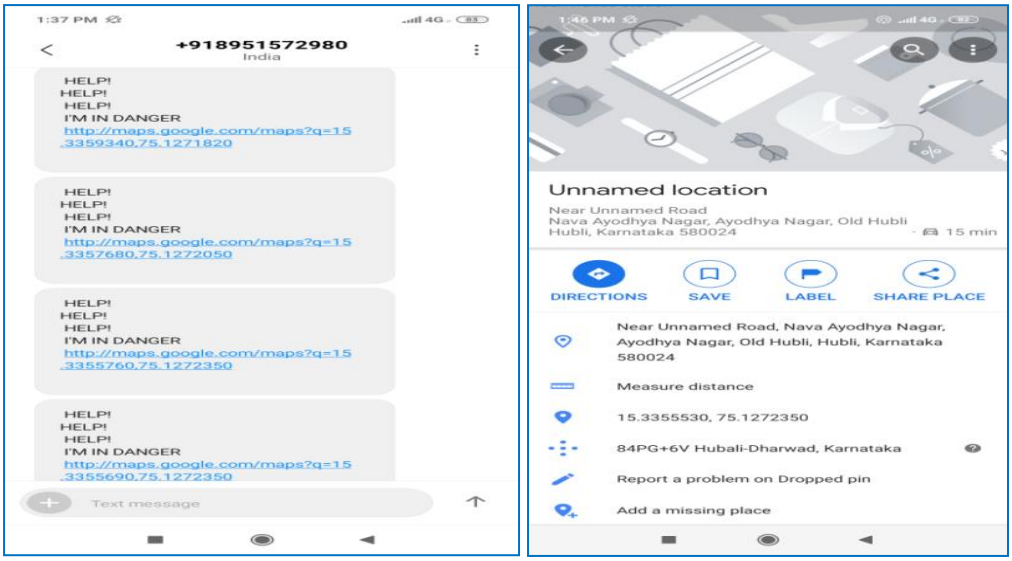

Fig 7: screen short of messages.

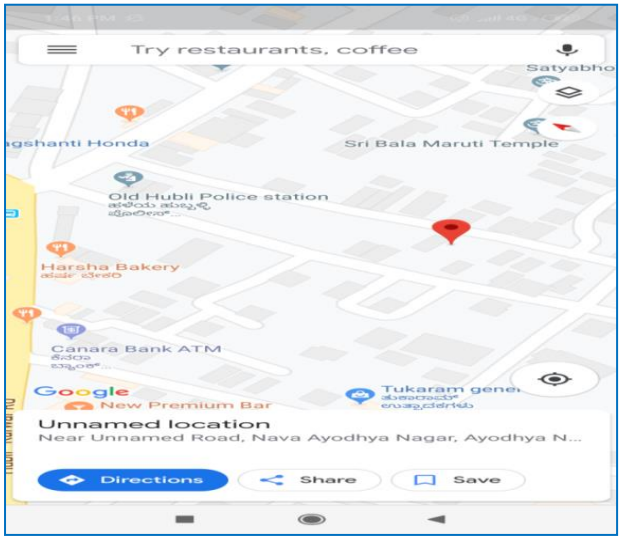

Fig 8: Screen short of the location.

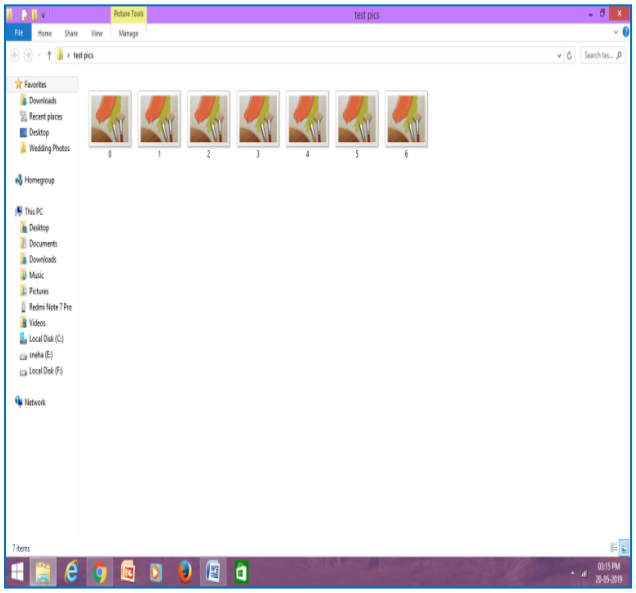

Fig 9: Screen short of images stored in SD card.

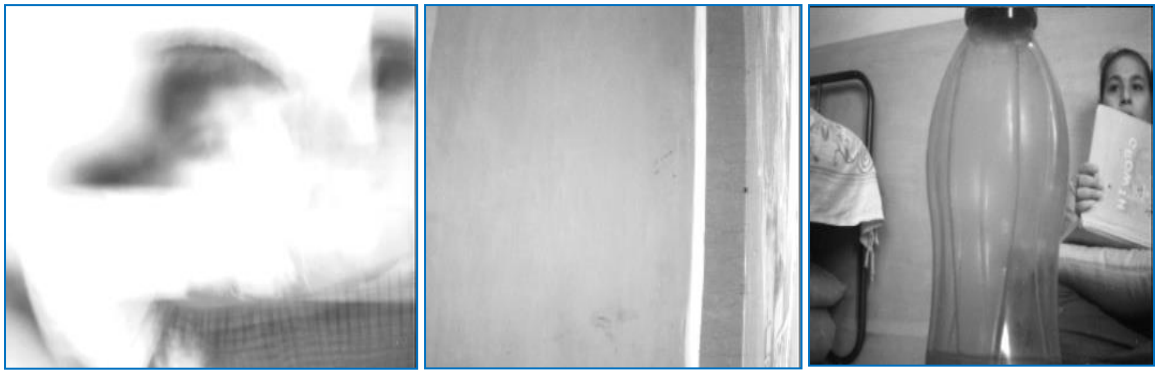

Fig 10: Sample images from camera module.

Fig 11: Outlook of the device

When the push button is pressed or when the person gets panic the SIM808 module and the camera module will be started, it takes the pictures and save it in SD card inserted in SD card module in csv format as shown in below fig.9

The image captured by the camera and stored in SD card are in hex values. The image is decoded using the python software. Using "hex Editor" copy the hex values in a file and save it as 'data.bmp'. Execute the python code the clear image will be saved as shown in Fig 10.

The fig 11 shows the outlook of the wearable device in the form of jacket which can be used by the person who desire to avail the self safety and security.

7. ADVANTAGES AND APPLICATIONS

7.1. Advantages

- Alert message to mobile phone for remote information
- Mobile number can be changed at any time Safety is portable.
- These devices will be used for safety purpose which will be easier for carrying from place to place.
- Easy and fast to install.
- This system will be easy to handle. Low cost with high performance.
- The device will be in a low cost which will work with a good performance.
- Environmental friendly system. The system will not harmful for the surrounding.

7.2. Applications

- Can be used for the safety of women.
- Can be used for the safety of children.
- Can be used for the safety of elderly aged people.
- Can be used for the safety of physically challenged people.
- Can be used as a legal evidence of crime with exact location information for prosecution.

8. CONCLUSION

Being safe and secure is the demand of the day. Effort behind this project is to design a gadget which is so compact that provide advantage of personal security system. This design will deal with most of critical issues faced by women, specially challenged, children and will help them to be secure. Existing systems provide the mechanism to track the person who is under trouble. The proposed mechanism provides viewing the location of the victim in terms of latitude and longitude which can be further tracked by google maps. This system helps to decrease the crime rate. The images are captured when push button is pressed. When the person is unable to press the push button, it is

automated by the heart beat sensor and captures the images.

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